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Efficiency and Thrift

The New Demand upon the Industrial World

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INDUSTRY THE BASIS OF NATIONAL PROSPERITY

INDUSTRY in its manifold forms is the recognized foundation of human existence. It is thus both historically and coincidentally the economic basis of the state and of our national government. A large proportion of the aggregate of human endeavor is measured by the visible evidences of material benefit derived from organized forms of productive labor. In time of peace industrial enterprise is an essential element in the development of the race, the upbuilding and growth of communities, the establishment of order, the stability and permanency of both state and national governments, and the conduct of private life. In time of conflict it becomes a vitally important factor in equipping and sustaining contending armies in the field, and the indispensable source of maintenance of the engines of war.

THE PART OF INDUSTRY IN RECONSTRUCTION

During the period of reconstruction and rehabilitation of the world upon which we are entering it will devolve upon industry to do a large share in bringing about the improved conditions which we are seeking to attain. Not only will industrial efficiency be measured by the value and character of the service rendered to the people at large in supplying an abundance of

products, but it will also be measured by the degree of economy and thrift with which the products essential to business and private life are produced—the amount in dollars and cents which is saved to the consumer in manufacturing and distributing costs. Our progress thus far in the work of reconstruction has, in no small degree, been retarded by the world-wide spirit of unrest. We have been appalled to learn the extent of certain forms of propaganda having for their purpose the upheaval of existing conditions both in government and business and the overthrow of the established order of both national and private life. Labor strikes, both in this country and in Europe, have accomplished the disorganization of the normal functions of human activity. We are, for these reasons, facing a future of industrial uncertainties which at present offer little hope of a speedy adjustment of the many perplexing problems before us or a permanent reestablishment of a rightly ordered basis of living.

IMPORTANCE OF INDUSTRIAL EFFICIENCY

In view of these facts it becomes imperative that all our industrial operations be placed upon a higher plane of efficiency and economy in order to render a larger measure of assistance during the present period of increasing unrest and distress. It is essential that manufacturers and

managers everywhere institute anew processes of investigation and analysis in order to determine where they stand in the competitive scale of productive power among the industries of the world. Extravagance and waste and inefficiency have heretofore been nearly universal. Nowhere have invested wealth and capital attained a full measure of success commensurate with the possibilities involved, or produced results representing one hundred per cent utility of equipment and facilities supplied. Large resources have been devoted to industrial enterprise only to demonstrate that net earnings are not comparable with initial expenditures, and nowhere do we obtain the full benefit of human effort or the largest product possible through the consumption of labor and material.

Many industries are handicapped by high manufacturing costs through failure to establish proper systems of economic control in all the functions of industrial operation. In many manufacturing plants there is evident a large degree of inefficiency and waste, coincident with which there usually exists a lack of coordination and cooperation in the functions of management and factory supervision. Losses and delays in production occur because of incorrect or incomplete designing, improper and inadequate distribution and supply of tools and materials to the shop, incomplete drawings and instructions to the workmen, and lack of care in authorizing and following out production schedules. To these add defective equipment, unsanitary shop conditions and lack of interest in the individual, and we have the chief explanation of the universal decreased effectiveness of human endeavor and

the inevitable curtailment of the volume of industrial product.

Statements of the ratio between capacity and accomplishment in industrial undertakings are sometimes exaggerated and pessimistic, but one does not need to look far to perceive that too large a factor of the world's labor is expended in the consumption of man-power and energy without a satisfactory commensurate return.

ORGANIZATION FOR MORE EFFICIENT SERVICE

We have a gigantic task, a stupendous work, to perform, if we are to meet all the problems of reconstruction at home and render our share of service in rehabilitating the war-torn and ravaged sections of the earth. We cannot hope to accomplish this task rightly and completely without a changed vision of the problems of production, of commerce and labor and of the distribution of the material necessities of life. It will not be sufficient simply to produce in quantity. It will be our greater duty to establish a higher order of efficiency and to practice a degree of thrift in all our industrial processes which will enable us to meet the pressing needs of the people at greatly reduced manufacturing costs.

New Lines of Organization

The organization of new industrial undertakings will doubtless have to be developed along new lines. Industries will need to be established for more definite and specific purposes. The plans for founding new business or building new factories must give greater consideration to a proper differentiation between that portion of the product or apparatus which it is desirable to manufacture at the home

assembly plant and those parts or details which can be purchased with greater economic advantage from outside concerns engaged in the production of small parts. Because of this fact it will be necessary to analyze more exhaustively the principal phases of proposed organization and all acts relating to the founding of a new industry in the beginning, in order to proceed with fully defined plans in reference to the nature and extent of the equipment required, lay-out and construction of departments and buildings, and the spaces to be allotted to receiving, shipping, storage, etc.

Concentration of productive processes and of tools and equipment on the one hand, and segregation of manufacture on the other, must be studied in the relations which they bear to transportation, to available sources of supply, to advantages in making purchasing contracts, to productive efficiency, and coincidentally and directly to economic and profitable factory costs.

New Principles of Management

The advanced principles of management and supervision must receive a new degree of attention, and more scientific thought and study must be given to the subject of coordination and cooperation of executive and productive forces. Greater concentration of authority and of allofficial acts, the elimination of repetition and duplication of directive effort, and the establishment of higher standards of operation, involving greater speed and precision and greater finality in all the rules of shop practice, will be essential to meet the demands of progress in the new industrial period that is before us. New standards must be set up as rapidly as new experiences have

developed new knowledge and have demonstrated more practical methods of performing either official or mechanical work.

Constructive Engineering and Designing

Our engineering and designing work will need to be more constructive, more final in its application to shop processes. The experimental stage of new designs will have to be wrought out and completed in a field or department by itself. The new order of things and the rapidity with which a new invention of public or private utility must be put into production will render imperative a greater degree of completeness and refinement in design than has heretofore been realized. When the shop starts work it must be with well defined plans and instructions, with no stoppage of productive processes through uncertainty or lack of information, and with the stamp of finality and accuracy upon every workman's drawing as he takes up each new task on bench or machine.

Improved Production Routine

In the organization of production routine there must be a broader and more intimate knowledge of shop conditions, in order that the movement of materials in rapid, progressive order and sequence of operations may be provided for, and the delivery of separate details to the assembly floor with regularity and certainty accomplished. This will involve a more extended analysis of both human labor and shop equipment, a rearrangement frequently of men and machine tools, in order to systematize movements and secure greater precision of actions both manual and mechanical. It will involve a greater

refinement of shop processes, the substitution of modern tools for old, of machine performance for manual tasks, and a general speeding up of all operations in effective unison of effort toward a common end.

The old methods of handling production must be eliminated from present industrial establishments and the progressive shop of the future. The distributing of tools and materials, instituting schedules of output, or providing the workman with drawings and instructions, must be with such accuracy and promptness of service as shall render the application of all directive effort to manufacturing processes efficient and complete.

Production routine cannot be divorced from indirect labor in any analysis looking toward improvement in industrial processes as a whole. The systematic supply and movement of materials through successive machine and assembly operations are directly dependent upon the expense forces of the shop. These forces need to be organized into units of proper size for harmonious action and cooperative effort. Careful supervision and patient instruction need to be given, the standard of service raised and a higher degree of efficiency established in the same manner that we demand precision and cohesion in mechanical work.

Purchasing Raw Materials

The purchasing department has a new and added burden and a more difficult task to perform brought about by the world war. Many new problems are involved in obtaining the factory's supply of raw materials which did not exist three years ago. With increased cost of metals and

fabrics other influences have combined to make the work of the purchasing agent hard and often impossible of result. Retarded output due to strikes, increasing consumption and demand in every part of the world, congestion and delays in transportation, all tend to render the obtaining of stocks more and more a matter of uncertainty and delay.

With these increasing difficulties greater effort must be made, not only to find new available sources of supply, but to conserve and save in the purchase and use of everything required by the shop. System of control must be set up in every department and rigid rules of economy established which shall make impossible the improper employment or wasting of anything of inherent value. This will involve the instituting of new methods of procedure in most factories, for as a nation and as individuals we have not yet taught ourselves the full lesson of economy either in the administration of government or of industrial enterprise. We are predisposed to extravagance and waste, to inordinate desire to have everything in abundance, to the consumption of many material things which cannot be demonstrated to be of essential value to either our physical well being or our mental advancement and growth. Not only productive stocks but expense supplies and materials for maintenance of equipment and for the prosecution of daily office and shop routine must receive greater attention than in the past, and new practices be established which will limit and conserve the use of these materials within the bounds of carefully regulated and scheduled manufacturing requirements.

Greater Efficiency in Power Production

The production of power, heat, and light is a field demanding special attention at the present time. It offers new opportunity for vast improvements in the type and character of installations, and a higher degree of economy in operation. The present fuel shortage lays new emphasis upon the need for more investigation and study, on the part of manufacturers and managers, into the cost of electrical energy and of steam for heating and manufacturing purposes. New stations will have to be built and extensions planned to provide for large increases in generating capacity. The old equipment of engines and boilers must be rapidly superseded by modern apparatus before power can take its proper place among other functions of industry already engaged in the conservation and building up of the world's resources. There must be immediate recognition of the need for more efficient installations from year to year, more scientific methods of operation and better systems of control of consumption in the shop, in order to keep pace with the present and future growth of industrial supply and demand.

Conserving Industrial Wastes

A new interest has been awakened in the subject of salvaging wastes which is obviously the direct result of the war. Conservation in industry has within the brief space of less than three years become a world-wide slogan. The world is fast becoming aroused to the fact, that saving is now one of the chief, vital principles of existence; that the extravagant, wasteful practices of the past mean ruin to the nation continuing them, and that it is necessary to remould our

thought and action to higher standards in both political and economic life.

In industry these words have assumed a new and more vital significance for us since our entrance into the world's struggle to establish a firmer, more stable foundation of peace. Saving and utilizing the by-products of production have gained a new prominence among other established practices of recognized value in engineering and manufacturing. There now exists a paramount necessity to save everything of inherent value which cannot be ignored or gainsaid. It is becoming pressingly evident that we must reorganize our present practices both in business and manufacturing in order to meet the new problems brought about by the world war. It is plainly the duty of industrial managers everywhere, of the leaders of big business of every kind and of the citizen in every calling of life, to study in this great crisis the conservation of waste and the salvaging of the by-products of production and every-day living as never before in the history of our country. Not a pound of metal or fabric; not a drop of essential oils or chemicals; not a piece of leather, rubber or wood; not even a scrap of paper, should be allowed to go to waste or escape the process of reclamation.

Salvaging industrial wastes has a more far-reaching significance than most people realize. The necessity for universal, energetic action is now multiplied a thousand fold. It is obvious that the unnecessary consumption of finished fabrics or failure to reclaim by-products necessitates increased production of raw materials, and increased production, of whatever nature, means additional labor, addi-

tional transportation facilities, the tying up of railway equipment and congestion of traffic; all of which seriously affect the movement of the long list of products required by the consumer.

The conservation of by-products is more emphatically brought to our attention by the exigencies of the great industrial struggle now going on, by the measure of uncertainty of continued and uninterrupted production of many of the important commodities of life, and by the increase in living expenses of the people beyond reasonable and just bounds. There appears at present no ray of light forecasting to a satisfactory degree the establishment of a properly stabilized condition of things in the industrial labor field.

The gigantic strides of business, the growth of new communities, the wealth of big cities and the world-wide demand for products have all tended to develop a confidence in our abounding resources and a habit of wastefulness both in production and consumption. This tendency has been conspicuous in governmental operations, in the building and operation of systems of transportation, in many public enterprises, and in the operation of manufacturing plants as well. Contiguous areas between shops, as well as factory floors and storerooms, show accumulations of metals and other materials, left over from productive processes or from the work of maintenance and repairs. Lack of time and reduced labor forces make it convenient to leave the disposal of these materials to some future date.

Successive inventories frequently show lists of parts held for possible supply orders which could judiciously

be turned into the scrap market at advantageous prices and thus aid in maintaining the country's supply of essential metals. Comparatively few industries are free from these accumulations and few realize the extent of the loss entailed through neglect to save and sell their by-products systematically, as an important part of business. It is essential, now more than at any previous period in the history of manufacturing, that industrial managers give a fuller consideration to this most vital of factory subjects.

It is the practice of many managers to devote their attention chiefly to getting out large shipments of product, piling up profit and loss surplus, leading in novel engineering designs and in an efficient performance of manual and mechanical processes in the shop, while the conservation of wastes and utilization of factory by-products receive only a limited degree of attention. The failure to utilize by-products in these industries does not represent the true degree of efficiency with which manufacturing processes as a whole are conducted, nor may it always be a definite measurement of managerial and executive ability.

It may not always follow that the organization which does not pay systematic attention to this important phase of business is not progressive in other functions of manufacturing. It can, however, be stated as a generally accepted truth, that the industry which gives special care and consideration to the problems of thrift in general excels in all other phases of industrial operation, whether relating to executive capacities or to mechanical processes. Wastefulness is both a direct cause and result of errors in operation, a cause of decrease

in productive volume, of increased factory costs and a burden to the public in higher prices in finished fabrics and materials.

Waste Reclamation During the War

During the war much was done to incite the people to greater interest and activity in saving wastes. The whole nation was urged to establish practices of thrift and economy and to conserve materials in order to render assistance to the government in its time of need. The Reclamation Service of the Department of Commerce did a most valuable work in teaching the country to save. All kinds of metals, steel, iron, copper, brass, aluminum and alloys, and a variety of wastes such as rubber, rope, paper, cotton fabrics, bags, barrels, boxes, oils, chemicals, and residues of many sorts and kinds were reclaimed by manufacturers and by the people at large and sold or converted into by-products and bases of use in the prosecution of the war and of industrial enterprise.

During the period of conflict the amount of waste materials gathered increased approximately twenty-five per cent. In the year 1918 several items, including scrap metals, paper, rags, wool waste, bags and cotton linters aggregated more than one and one-half million dollars. The government itself took unusual interest in the work of conservation and reorganized its methods of disposing of waste. Many materials which the Army and Navy had disposed of by dumping and burning were carefully saved, sorted and classified and utilized or disposed of to good advantage.

The railroads also have caught the spirit of better economy and have developed new practices in the field

of conservation which have netted many millions in money return for scrap sold and in valuable materials saved for further use.

The larger industries of the country are rapidly beginning to view this subject in a new light and to assume their share of responsibility in this great work of putting human activity and human living on a more efficient, progressive and sounder economic basis. One of our big electrical plants is reclaiming more than eighty million pounds of scrap products annually. Others are studying the subject with a new interest and establishing systems which make for better economy and thrift. Such is the work of organization and such are the results which may be secured.

The Need of Permanent Reclamation Service

It is to be keenly regretted that the Senate Appropriations Committee failed to make any appropriation for the continuance of the Reclamation Service. Because of this fact the office has been closed. In view of the universal, pressing need for greater conservation and the almost incalculable value of the work to the nation, it is difficult to conceive any true justification of the committee's action. It requires but slight analysis to convince us that the department should be maintained as a permanent government service to the people. Through this office practical appeal could be made to the governors of states, through the governors of states to mayors of cities and presidents of villages, and through these latter men to the heads of boards of trade and to public spirited citizens, to cooperate in the great work of saving the nation's wastes. Through this channel also

could be disseminated much useful knowledge and instruction relating to the work of reclamation, which would thus reach in a helpful way not only the populous industrial centers but the outlying districts as well, and by this means bring about a widespread, concerted action for the public good. No one may attempt to predict the full extent of the value or the aggregate return of such a movement to the government and country at large.

A NEW CONCEPTION OF ECONOMY

No appeal to the manufacturer to save and utilize by-products can be made too forcible or too strong. What we need throughout the whole extent of America today is to learn individually and collectively as a nation the vital principles of economy and conservation. We need as a people to learn to save everything, of whatever intrinsic value, not simply during the present moment of great world-wide demand, not simply during the coming period of reconstruction work, but for all time to come. There is insistent need to establish those principles of thrift and economy in all our industrial undertakings, which shall make extravagance and wasteful practices things to be decried, and shall set a price of honor and credit upon the saving of the so-called unimportant things—the smaller by-products of manufacturing.

It should be the purpose of the management of industries, both large and small, in all parts of the country, to conserve everything possessed of inherent value. Proper consideration must be given to the cost of accumulation and preparation for market, but the work of reclamation should be carried on to as large an extent as

possible consistent with conditions and without actual loss. Improved methods of sorting and handling will usually permit a wider range of classifications which result in obtaining higher prices for the various classes and grades. The question of profit, however, in the process of reclamation should not always be the chief or deciding factor. It should be our aim to render all the assistance possible both to the national government and to the mills which manufacture raw materials or finished fabrics, in conserving everything that may be of use in production, and in consistently following out this principle we will be of practical service to the public at large.

CONSERVATION OF HUMAN LABOR

The factor of human labor has assumed a new and most important place in all industrial operations. During the recent world conflict its importance was multiplied a thousand fold. Today every productive process is manifestly dependent either directly or indirectly upon the constant application of human energy, mental or physical. It is evident, therefore, as we take up the work of reconstruction, that our efforts cannot be successfully carried forward without the coöperation of the individual and of skilled labor as a class. All our plans looking toward the establishment of a higher order of efficiency in manufacturing and a greater degree of economy must include the workmen whom we employ. It is now a part of our duty to teach them habits of thrift, the way to become provident, the way to accumulate and save. We must afford them assistance and encouragement in establishing homes, in investing in

real estate and bonds, in buying shares in the factories where they labor, in protecting their families with safe insurance, in educating their children, and in any and all ways help them in the growth and development of higher standards of life.

Now, as never before in the world's history, nations and governments are looking to industry to do the greater share in the united effort to establish an era of permanent prosperity and peace. And what does it all mean? It means that man-power at home is as big as man-power in the trench. It means that economy of effort and precision in action are as important in the factory as science and discipline on the fields of battle. Conserving human energy and devoting it to the business of the world's production must be accomplished by training and study just as definitely as we train for the scientific practices of war. New methods in the employment of help, adapting men to tasks for which they

are fitted, training them for higher service, instructing them in economy of physical strength, educating them in the maintenance of health and comfort and safety, are all problems of management which emphasize the greater responsibility of the nation's immediate future.

It is essential that the highest accomplishments possible of attainment shall be realized in all industrial enterprise. The call is to industry. If we are to attain political freedom and economic stability throughout the countries of the world, it must be through a higher refinement of man-power—a fuller degree of perfection in all the varied forms of manual and mechanical art. Systems of control must be set up in every factory in the land; analyses of all manufacturing operations, of official and directive functions, of every detailed process of production, must be instituted, which shall make possible the highest degree of perfection in all human endeavor.